



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/733,771

12/12/2003

Michael Cornelis Van Beek

081468-0307031

8730

909

7590

02/27/2007

PILLSBURY WINTHROP SHAW PITTMAN, LLP
P.O. BOX 10500
MCLEAN, VA 22102

EXAMINER

GUTIERREZ, KEVIN C

ART UNIT

PAPER NUMBER

2851

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
--	-----------	---------------

3 MONTHS

02/27/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/733,771	VAN BEEK ET AL.	
	Examiner	Art Unit	
	Kevin Gutierrez	2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to the newly amended claims 1, 3-5, 10, 13-15 and 20 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly found prior art.

Claim Objections

2. Claim 1 is objected to because of the following informalities: It has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. *In re Hutchinson*, 69 USPQ 138. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6, 8-16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Somekh (6,427,703) in view of Tanaka et al. (US 2001/0036741).

Regarding claims 1 and 14, Somekh discloses “a support structure (fig. 2A, 220; chamber) constructed to support a patterning device (208; mask), said patterning device adapted to pattern a beam of radiation (203; electron flux) according to a desired pattern;

- a substrate holder (212; wafer stage) constructed to hold a substrate (214; wafer);
- a projection system (210; projection lens) customized and arranged to project the patterned beam onto a target portion of the substrate (214; wafer); and
- a downstream radical source (216; oxidizer source) with a gas supply configured to provide a beam of radicals directed onto a surface of a component (208) to be cleaned (col. 7, lines 19-21).

Somekh does not disclose a downstream radical source having a tube connected to a gas supply and “wherein the radicals are generated within a flow of gas from the gas supply in the tube and “wherein the tube of the radical source is constructed and arranged to be moved relative to the surface to be cleaned and/or the component is constructed and arranged to be moved relative to the tube of the radical source so that the beam of radicals is incident on the surface to be cleaned.”

However, Tanaka et al. teach having a downstream radical source (fig 1, 1; plasma generator) having a tube (2; discharge tube) connected to a gas supply (3; gas feeder) and wherein the radicals are generated within a flow of gas from the gas supply in the tube ([0046], lines 4-7) and “wherein the tube (2) of the radical source (1) is constructed and arranged to be moved relative to the surface (Wa, Wb; wafer

Art Unit: 2851

portions) to be cleaned and/or the component is constructed and arranged to be moved relative to the tube (2) of the radical source (1) so that the beam of radicals is incident on the surface to be cleaned ([0015], lines 9-13, where the tube is movable and ejects radicals over the surface portions of a wafer).” Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify the downstream radical source of Somekh by including a moveable tube connected to the gas supply via piping of nozzles (224) that is moveable over a surface (208; mask) for at least the purpose of maintaining a contaminant-free surface.

Regarding claim 2, Somekh further discloses “wherein said beam of radicals contains substantially no ionized particles (col. 6, lines 25-29).”

Regarding claim 3, Somekh further discloses “wherein said gas supply (216), supplies at least one of oxygen, hydrogen, or fluorine (216).”

Regarding claim 4, Somekh further discloses “wherein said downstream radical source provides a beam of at least one of oxygen radicals, hydrogen radicals, or fluorine radicals (col. 6, lines 26-29).”

Regarding claim 5, Somekh further discloses “wherein said surface of the component to be cleaned is on one of the patterning device, a sensor, a lens, a deflector, or a beam reflector (col. 9, line 43 and lines 49-50).”

Regarding claim 6, Somekh further discloses “wherein the position of the downstream radical source is fixed (Fig. 2A, where 216 is connected to illumination chamber 204 and chamber 220 via nozzles (224 and 215).”

Regarding claim 8, Somekh further discloses “wherein the downstream radical source comprises one or more of an RF coil, a pair of DC discharge electrodes, a microwave cavity, and an RF cavity that generates a region of plasma within the flow of gas from the gas supply, the radicals being created in said plasma region (see col. 6, lines 39-43).”

Regarding claim 9, Somekh further discloses “wherein the downstream radical source comprises a high temperature element located within the flow of the gas from the gas supply, the temperature of the high temperature element being sufficient to cause thermal dissociation to create the radicals (col. 6, lines 39-43, where a plasma source creates thermal activation).”

Regarding claim 10, Somekh further discloses “an evacuated chamber (220) that contains the patterning structure (208), the substrate (214), and the projection system (210),

wherein the beam of radicals are discharged from an end of said tube (Figure 2C, 235; col. 7, lines 36-37), and said end of the tube (Figure 2C, 235; col. 7, lines 36-37) is located in the evacuated chamber (220).”

Regarding claim 11, Somekh further discloses “wherein the region of the downstream radical source (216) in which the radicals are formed is located outside of the evacuated chamber (Figure 2C, 216 is located outside of 230).”

Regarding claim 12, Somekh further discloses “wherein the apparatus comprises at least two downstream radical sources and corresponding beams of radicals for cleaning said surface (col. 10, lines 30-34).”

Regarding claims 13 and 20, Somekh further discloses “wherein said surface of the component to be cleaned comprises a surface of an optical element (see col. 3, lines 35-36).”

Regarding claim 15, Somekh as modified discloses the limitations set forth in claims 1 and 14 and further discloses “wherein said radical source (216) is disposed away from said radiation source (202) such that operating conditions of said radical source (216) do not adversely affect said beam of radiation (203).”

Regarding claim 16, Somekh further discloses “a plasma generator (col. 6, lines 38-41) to generate a plasma region, wherein gas from the gas supply (202) flows through the tube (Figure 2A) and through the plasma region such that neutral and ionized particles are created (col. 6, lines 26-29), and the beam of radicals exits the tube at an orifice (224) onto the surface to be cleaned (see col.7, lines 19-22).”

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Somekh in view of Tanaka et al., as applied to claims 1 and 6, and in further view of Horiike et al (5,308,791). The teachings of Somekh and Tanaka et al. have been discussed above.

Somekh as modified discloses “a structure to direct said beam of radicals onto said surface to be cleaned (see col.7, lines 19-22).” Somekh does not teach wherein “said structure comprising a device that moves the component containing said surface such that the beam of radicals is incident on said surface.”

However, having “said structure comprising a device that moves the component containing said surface such that the beam of radicals is incident on said

surface” is known in the art as is evident to the teaching of Horiike et al (col. 5, lines 6-7 and lines 15-18). It would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify Somekh as modified by including a device to move the component containing the surface to be cleaned in the direction where the beam of radicals is incident on the surface.

The ordinary artisan would have been motivated to further modify Somekh as modified in a matter described above for at least the purpose to clean a specified portion of the surface.

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Somekh in view of Tanaka et al., as applied to claims 15 and 16, and in further view of Sakai et al. (5,312,519). The teachings of Somekh and Tanaka et al. have been discussed above.

Somekh as modified discloses the limitations set forth in the claims except “wherein walls of the tube neutralize the ionized particles.”

However, having “wherein walls of the tube neutralize the ionized particles” is known in the art as is evident to the teaching of Sakai et al (col. 2, lines 49-51; col. 3, lines 49-51). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify Somekh as modified by including a discharge tube for at least the purpose to neutralize the ionize particles.

The ordinary artisan would have been motivated to further modify Somekh as modified to utilize a discharge tube to provide a more uniform stream of neutralized ion particles.

7. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Somekh in view of Tanaka et al., as applied to claims 15 and 16, and in further view of Vane (6,105,589). The teachings of Somekh and Tanaka et al. have been discussed above.

Somekh as modified discloses the limitations set forth in claims except (claim 18) “wherein a Faraday grid neutralizes the ionized particles” and (claim 19) “wherein the Faraday grid is disposed at the orifice of the tube.”

However, having “wherein a Faraday grid neutralizes the ionized particles” and “wherein the Faraday grid is disposed at the orifice of the tube” is known in the art as is evident to the teaching of Vane (col. 7, lines 62-65). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify Somekh as modified by including a Faraday grid located at the opening of a tube to neutralizes ionized particles.

The ordinary artisan would have been motivated to further modify Somekh as modified for at least the purpose to provide a more uniform stream of neutralized ion particles.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Gutierrez whose telephone number is (571)-272-5922. The examiner can normally be reached on Monday-Friday: 8:00 a.m. - 5:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on (571)-272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2851

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kevin Gutierrez
Examiner
Art Unit 2851

February 15, 2007

A handwritten signature in black ink, appearing to read 'Henry Hung Nguyen', written in a cursive style.

HENRY HUNG NGUYEN
PRIMARY EXAMINER